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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/623,283	07/18/2003	Cory Watkins	A126.111.102	2405

25281 7590 01/17/2007

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EXAMINER	
LE, BRIAN Q	

ART UNIT	PAPER NUMBER
2624	

MAIL DATE	DELIVERY MODE
01/17/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/623,283	WATKINS, CORY
	Examiner	**Art Unit**
	Brian Q. Le	2624

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 October 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) *4 and 12* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3, 5-11, and 13-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *07/18/2003*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

Response to Amendment and Arguments

1. Applicant's amendment filed October 27, 2006, has been entered and made of record.

2. The rejection of claims 1-15 under Doctrine of Obviousness-Type Double Patenting is withdrawn since the Terminal Disclaimer has been approved.

3. The objection of claims 5-7, 13-15, and 17-19 is withdrawn because the Applicant has amended the claims to address the objection.

4. Applicant's arguments, see Remarks, filed 10/27/2006, with respect to the rejection of claims 1-3 and 8-10 under 35 U.S.C. 102 (b) as being anticipated by Roberts U.S. Patent No. 5,541,654 have been fully considered and are persuasive. The rejection of claims 1-3 and 8-10 under 35 U.S.C. 102 (b) as being anticipated by Roberts has been withdrawn.

5. Applicant's arguments with regard to claims 1-5, 8-13, 16 and 17 rejected under 35 U.S.C. 103 (a) as being unpatentable over Neumann U.S. Patent No. 6,693,664 and Robert U.S. Patent No. 5,541,654 have been fully considered, but are not considered persuasive because of the following reasons:

Regarding claim 1, the Applicant argues (bottom of page of the Remarks) that there is no suggestion to combine the cited references, Robert and Neumann. The Examiner respectfully disagrees. First, Robert teaches an art wherein a camera (imaging device) wherein a camera with the ability to selectively readout a number of rows (please refer to previous Office Action for the teaching) wherein the camera can be use for taking image/snap shot of image scene application (Robert, abstract). Neumann teaches an inspection system (abstract, first 5 lines) wherein utilizes a camera/imaging system to readout a number of rows/taking a snap shot of image scene of semiconductor substrate (please refer to previous Office Action for the teaching). Thus, it

would have been obvious to one skilled in the art to take advantage of Robert's teaching of camera of selectively readout a number of rows to combine with the teaching of Neumann of an inspection system to have a camera with the ability to selectively readout a number of rows (selectively take a snap shot of a semiconductor substrate) so that the inspection is configured to inspect semiconductor substrates. Thus, the prima facie case of obviousness has been clearly established.

Thus, the rejections of all of the claims are maintained.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1-3, 5, 8-11, 13, and 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Neumann U.S. Patent No. 6,693,664 and Roberts U.S. Patent No. 5,541,654.

Regarding claim 1, Neumann discloses an inspection system (abstract, first 5 lines) including a camera (electro-optical camera system with CCD matrix photo-detector at column 5, lines 15-25) for taking an image of a semiconductor die, from which images of patterns of each dies (image of interest) (FIG. 1B, steps 6, 8 and 9) to readout a number of rows ("This optical configuration enables illumination of a wafer die with a single laser pulse and simultaneous imaging by an array, of twenty-four two dimensional CCD matrix photo-detectors, having a total of about 48 million (48 mega) pixels" at column 11, lines 2-6 and FIG. 5B), wherein the

inspection system is configured to inspect semiconductor substrates (a system to detect wafer defect) (abstract, first 5 lines and column 6, lines 3-7).

Neumann does not teach a camera with the ability to **selectively** readout a number of rows (emphasis added).

Roberts teaches, in the same problem solving area of selective image accessing, a camera with the ability to selectively ("The imaging device includes provision for random access of each image element or group of image elements in the array so that output signals indicative of all or of only selected parts of an imaged scene can be processed for the image information, if desired.", abstract) readout a number of rows ("an imaging array" at column 3, line 14; "windowing on the array" at column 3, line 18; "randomly accessing the image elements individually or in groups of less than the full plurality of elements on the array" at column 3, line 35) of the image of interest (column 1, lines 20-23).

Modifying Neumann's method of providing an inspection system according to Roberts would able to provide a camera that is selectively readout a number of rows at a region of interest. This would improve processing because rather than capturing the entire image, according to the teaching of Roberts, only those images of interest (rectangular areas) need to be scanned out of the imaging device to begin with. One would be motivated to modify Neumann according to Roberts to "of the reduced number of pixels in the windows ... in comparison to the number of pixels in the entire array", the "windows ... may be scanned at a frame rate much greater than would be possible if the entire array 12 had to be scanned" (Roberts, column 10, lines 15-20), thus speed up the processing, reduce the buffer (column 9, line 35-36) and minimizes the chances of the imaging device being overload with incoming light so that the

imaging system is blinded (column 11, lines 10-14) and therefore, it would have been obvious to one of the ordinary skill in the art to modify Neumann according to Roberts.

For claim 2, Roberts further teaches a controller that programs the camera (imaging device that includes provision for random access of each image element or group of image elements, abstract) to readout a specified number of rows ("an imaging array" at column 3, line 14; "windowing on the array" at column 3, line 18; "randomly accessing the image elements individually or in groups of less than the full plurality of elements on the array" at column 3, line 35).

Regarding claim 3, Roberts also teaches the camera includes an imager (imaging device) (column 4, line 19) having a first number of rows, and wherein the specified number of rows is less than the first number of rows ("randomly accessing the image elements individually or in the groups less than the full elements in the array") (column 3, lines 35-37 and column 7, lines 39-45).

Regarding claim 5, Neumann teaches the inspection system (abstract, first 5 lines) wherein the semiconductor substrates (wafer) (FIG. 6 and FIG. 1A, step (1)) comprise a plurality of semiconductor die (wafer) (FIG. 6 and FIG. 1A, step (1)) and wherein the controller is configured (configuration) to program the camera ("This optical configuration enables illumination of a wafer die with a single laser pulse and simultaneous imaging by an array, of twenty-four two dimensional CCD matrix photo-detectors, having a total of about 48 million (48 mega) pixels" at column 11, lines 2-6 and FIG. 5B) to readout semiconductor die (image of interest) (FIG. 1B, steps 6, 8 and 9).

Neumann does not teach a camera to read out the specified number of rows based on a size of semiconductor die (which can be an image of interest). Roberts teaches, in the same problem solving area of selective image accessing, a camera with the ability to readout the specified number of rows ("an imaging array" at column 3, line 14; "windowing on the array" at column 3, line 18; "randomly accessing the image elements individually or in groups of less than the full plurality of elements on the array" at column 3, line 35) base on the image of interest (column 1, lines 20-23; FIG. 6, elements 172 and 174).

Modifying Neumann's method of providing an inspection system according to Roberts would able to provide a camera that is readout a specified number of rows at a region of interest such as a semiconductor die/pattern. This would improve processing because rather than capturing the entire image, according to the teaching of Roberts, only those images of interest (semiconductor die) need to be scanned out of the imaging device to begin with. One would be motivated to modify Neumann according to Roberts to "of the reduced number of pixels in the windows … in comparison to the number of pixels in the entire array", the "windows … may be scanned at a frame rate much greater than would be possible if the entire array 12 had to be scanned" (Roberts, column 10, lines 15-20), thus speed up the processing, reduce the buffer (column 9, line 35-36) and minimizes the chances of the imaging device being overload with incoming light so that the imaging system is blinded (column 11, lines 10-14)and therefore, it would have been obvious to one of the ordinary skill in the art to modify Neumann according to Roberts.

Regarding claim 8, Neumann discloses an inspection system (abstract, first 5 lines) including a camera (electro-optical camera system with CCD matrix photo-detector at column 5,

lines 15-25) for taking an image of a semiconductor die, from which images of patterns of each dies (image of interest) (FIG. 1B, steps 6, 8 and 9) to readout groups of pixels ("This optical configuration enables illumination of a wafer die with a single laser pulse and simultaneous imaging by an array, of twenty-four two dimensional CCD matrix photo-detectors, having a total of about 48 million (48 mega) pixels" at column 11, lines 2-6 and FIG. 5B) in one axis of an imager (FIG. 2, element 12) of the camera ("electro-optical camera system" at column 5, line 17).

Neumann does not teach a camera with the ability to **selectively** readout groups of pixels (emphasis added).

Roberts teaches, in the same problem solving area of selective image accessing, a camera with the ability to selectively ("The imaging device includes provision for random access of each image element or group of image elements in the array so that output signals indicative of all or of only selected parts of an imaged scene can be processed for the image information, if desired.", abstract) readout groups of pixels ("an imaging array" at column 3, line 14; "pixels" at column 3, line 22; "windowing on the array" at column 3, line 18; "randomly accessing the image elements individually or in groups of less than the full plurality of elements on the array" at column 3, line 35) of the image of interest (column 1, lines 20-23).

Modifying Neumann's method of providing an inspection system according to Roberts would able to provide a camera that is selectively readout groups of pixels at a region of interest. This would improve processing because rather than capturing the entire image, according to the teaching of Roberts, only those images of interest (rectangular areas) need to be scanned out of the imaging device to begin with. One would be motivated to modify Neumann according to

Roberts to "of the reduced number of pixels in the windows ... in comparison to the number of pixels in the entire array", the "windows ... may be scanned at a frame rate much greater than would be possible if the entire array 12 had to be scanned" (Roberts, column 10, lines 15-20), thus speed up the processing, reduce the buffer (column 9, line 35-36) and minimizes the chances of the imaging device being overload with incoming light so that the imaging system is blinded (column 11, lines 10-14) and therefore, it would have been obvious to one of the ordinary skill in the art to modify Neumann according to Roberts.

Referring to claim 9, Robert teaches a controller (microprocessor) (FIG. 6, element 160) that programs (provides provision) (abstract, "The imaging device includes provision to random access ...") the camera (imaging device) (abstract).

For claim 10, Robert also teaches the controller programs the camera (as discussed in claim 9) to readout a specified number of groups of pixels in one axis of the imager ("an imaging array" at column 3, line 14; "windowing on the array" at column 3, line 18; "randomly accessing the image elements individually or in groups of less than the full plurality of elements on the array" at column 3, line 35).

Regarding claim 11, Roberts also teaches an imager (imaging device) (column 4, line 19) having a first number of rows, each of the groups of pixels is a row of pixels, and the specified number of groups of pixels is less than the first number of rows ("randomly accessing the image elements individually or in the groups less than the full elements in the array") (column 3, lines 35-37 and column 7, lines 39-45).

Regarding claim 13, Neumann teaches the inspection system (abstract, first 5 lines) wherein the semiconductor substrates (wafer) (FIG. 6 and FIG. 1A, step (1)) comprise a plurality

of semiconductor die (wafer) (FIG. 6 and FIG. 1A, step (1)) and wherein the controller is configured (configuration) to program the camera ("This optical configuration enables illumination of a wafer die with a single laser pulse and simultaneous imaging by an array, of twenty-four two dimensional CCD matrix photo-detectors, having a total of about 48 million (48 mega) pixels" at column 11, lines 2-6 and FIG. 5B) to readout semiconductor die (image of interest) (FIG. 1B, steps 6, 8 and 9).

Neumann does not teach a camera to read out the specified number of groups of pixels based on a size of semiconductor die (which can be image of interest). Roberts teaches, in the same problem solving area of selective image accessing, a camera with the ability to readout the specified number of groups of pixels ("an imaging array" at column 3, line 14; "windowing on the array" at column 3, line 18; "randomly accessing the image elements individually or in groups of less than the full plurality of elements on the array" at column 3, line 35) base on the image of interest (column 1, lines 20-23; FIG. 6, elements 172 and 174).

Modifying Neumann's method of providing an inspection system according to Roberts would able to provide a camera that is readout a specified number of groups of pixels at a region of interest such as a semiconductor die. This would improve processing because rather than capturing the entire image, according to the teaching of Roberts, only those images of interest (semiconductor die) need to be scanned out of the imaging device to begin with. One would be motivated to modify Neumann according to Roberts to "of the reduced number of pixels in the windows ... in comparison to the number of pixels in the entire array", the "windows ... may be scanned at a frame rate much greater than would be possible if the entire array 12 had to be scanned" (Roberts, column 10, lines 15-20), thus speed up the processing, reduce the buffer

(column 9, line 35-36) and minimizes the chances of the imaging device being overload with incoming light so that the imaging system is blinded (column 11, lines 10-14)and therefore, it would have been obvious to one of the ordinary skill in the art to modify Neumann according to Roberts.

Regarding claim 16, Neumann teaches an automated method (column 7, lines 13-16) for inspecting (abstract, first 5 lines) a plurality of semiconductor die (FIG. 1A, step (1)), the method comprising:

Providing a camera including an imager (electro-optical camera system with CCD matrix photo-detector to take image at column 5, lines 15-25);

Capturing image frames (column 5, lines 60-65) of the plurality of semiconductor die with the imager (wafer of semiconductor dies) (FIG. 1A, step (1)), each captured frame including first number of rows of pixels ("This optical configuration enables illumination of a wafer die with a single laser pulse and simultaneous imaging by an array, of twenty-four two dimensional CCD matrix photo-detectors, having a total of about 48 million (48 mega) pixels" at column 11, lines 2-6 and FIG. 5B);

Reading out pixel data from the imager for each captured frame (FIG. 1B, step (8) and step (8), (A));

Identifying defects in the plurality of semiconductor die based on the pixel data read out of the imager (FIG. 1B, step (8), (B)).

Neumann does not explicitly teaches a camera wherein each captured frame including a second number of rows of pixels that is less than the first number of rows of pixels.

Roberts teaches, in the same problem solving area of selective image accessing, a camera with the ability readout a second number of rows ("windowing on the array" at column 3, line 18 of the image of interest at column 1, lines 20-23) that is less than the first number of rows of pixels ("randomly accessing the image elements individually or in groups of less than the full plurality of elements on the array" at column 3, lines 35-37; full elements of array is first number of rows).

Modifying Neumann's method of providing an inspection system according to Roberts would able to provide a camera that is selectively readout a number of rows at a region of interest. This would improve processing because rather than capturing the entire image, according to the teaching of Roberts, only those image of interest (rectangular areas) need to be scanned out of the imaging device to begin with. One would be motivated to modify Neumann according to Roberts to "of the reduced number of pixels in the windows ... in comparison to the number of pixels in the entire array", the "windows ... may be scanned at a frame rate much greater than would be possible if the entire array 12 had to be scanned" (Roberts, column 10, lines 15-20) and therefore, it would have been obvious to one of the ordinary skill in the art to modify Neumann according to Roberts.

Regarding claim 17, Neumann teaches the inspection system (abstract, first 5 lines) wherein the semiconductor substrates (wafer) (FIG. 6 and FIG. 1A, step (1)) comprise a plurality of semiconductor die (wafer) (FIG. 6 and FIG. 1A, step (1)) and wherein the controller is configured (configuration) to program the camera ("This optical configuration enables illumination of a wafer die with a single laser pulse and simultaneous imaging by an array, of twenty-four two dimensional CCD matrix photo-detectors, having a total of about 48 million (48

mega) pixels" at column 11, lines 2-6 and FIG. 5B) to readout semiconductor die/pattern (image of interest) (FIG. 1B, steps 6, 8 and 9).

Neumann does not teach a camera to read out the specified number of rows based on a size of semiconductor die/pattern (which can be an image of interest). Roberts teaches, in the same problem solving area of selective image accessing, a camera with the ability to readout the specified number of rows ("an imaging array" at column 3, line 14; "windowing on the array" at column 3, line 18; "randomly accessing the image elements individually or in groups of less than the full plurality of elements on the array" at column 3, line 35) base on the image of interest (column 1, lines 20-23; FIG. 6, elements 172 and 174).

Modifying Neumann's method of providing an inspection system according to Roberts would able to provide a camera that is readout a specified number of rows at a region of interest such as a semiconductor die/pattern. This would improve processing because rather than capturing the entire image, according to the teaching of Roberts, only those images of interest (semiconductor die/pattern) need to be scanned out of the imaging device to begin with. One would be motivated to modify Neumann according to Roberts to "of the reduced number of pixels in the windows ... in comparison to the number of pixels in the entire array", the "windows ... may be scanned at a frame rate much greater than would be possible if the entire array 12 had to be scanned" (Roberts, column 10, lines 15-20), thus speed up the processing, reduce the buffer (column 9, line 35-36) and minimizes the chances of the imaging device being overload with incoming light so that the imaging system is blinded (column 11, lines 10-14)and therefore, it would have been obvious to one of the ordinary skill in the art to modify Neumann according to Roberts.

8. Claims 6, 14 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination Neumann U.S. Patent No. 6,693,664 and Roberts U.S. Patent No. 5,541,654, as discussed in claim 5, and further in view of Tsuneta et al. U.S. Patent No. 6,570,156.

Regarding clam 6, Neumann teaches the adjustments of focus for field of view of the camera to properly position (fit) to the semiconductor die. Neumann does not explicitly teach that the size of the semiconductor is less than field of view of the camera. Tsuneta teaches a semiconductor inspection system (FIG. 10, "select inspected filed" and "inspect"; and column 26, line 55) wherein the size of the semiconductor die is less than field of view of the camera (when the field of view of the camera is clipped, thus the semiconductor pattern is smaller) (column 26, lines 65-67).

Modifying Neumann's method of inspecting semiconductor substrate according to Tsuneta would able to clip the field of view to the size of the semiconductor pattern. This would improve processing because according to Tsuneta, "the same size of image will be suitable for the registered image to be compare with", so that the "position of clipped field of view will be shifted to the next to iteratively evaluate the consistency of the pattern" (column 26, line 65 to column 27, lines 7) and therefore, it would have been obvious to one of the ordinary skill in the art to modify Neumann according to Tsuneta.

For claim 14, please refer back to the teachings and explanations of claim 6.

For claim 18, please refer back to the teachings and explanations of claim 6.

9. Claims 7, 15 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination Neumann U.S. Patent No. 6,693,664 and Roberts U.S. Patent No. 5,541,654, as discussed in claim 5, and further in view of Isogai et al. U.S. Patent No. 6,457,232.

Regarding claim 7, Neumann teaches the adjustments of focus for field of view of the camera to properly position (fit) to the semiconductor die. Neumann does not explicitly teach that the size of the semiconductor is greater than field of view of the camera. Isogai teaches a chip substrate inspection method (column 2, lines 31-49) wherein the chip pattern is greater than a field of view of the camera (column 25, lines 13-22).

Modifying Neumann's method of inspecting semiconductor substrate according to Isogai would able to determine the die or pattern that is greater than field of view of the camera (column 25, lines 19-25). This would improve processing because according to Isogai, by determine the die that is greater than field of view of the camera would allow the system to take a different image that substantially identical with the die/pattern/icon (column 25, lines 20-34) to further determine the standard chip with accuracy (column 2, lines 40-49) and therefore, it would have been obvious to one of the ordinary skill in the art to modify Neumann according to Isogai.

For claim 15, please refer back to the teachings and explanations of claim 6.

For claim 19, please refer back to the teachings and explanations of claim 6.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian Q. Le whose telephone number is 571-272-7424. The examiner can normally be reached on 8:30 A.M - 5:30 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mathew Bella can be reached on 571-272-7778. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Matthew C. Bella

BL
January 10, 2007

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